Superfund Program
Proposed Plan

U.S. Environmental Protection Agency
Region II

123495

Scientific Chemical Processing Site
August 2012

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan identifies the U.S. Environmental Protection Agency's (EPA's) Preferred Alternative for addressing off-property and deep groundwater contamination at the Scientific Chemical Processing (SCP) Superfund Site (Site) in the Borough of Carlstadt, New Jersey. The Preferred Alternative for the contaminated groundwater is in-situ treatment, monitored natural attenuation and institutional controls. This Proposed Plan includes summaries of the cleanup alternatives that were evaluated for use at the Site. This document is issued by EPA, the lead agency for the Site, in conjunction with the New Jersey Department of Environmental Protection (NJDEP), the support agency.

EPA is issuing this document as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), and Section 300.435 (c)(2)(ii) of the NCP. This document summarizes information that can be found in detail in the Administrative Record file for the Site. This Proposed Plan is being provided to inform the public of EPA's preferred remedy, and to solicit public comments pertaining to the preferred alternative. The remedy described in this Proposed Plan is the preferred remedy for the Site. Changes to the preferred remedy, or a change from the preferred remedy to another remedy, may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after EPA has taken all public comments into consideration. Therefore, the public is encouraged to review and comment on the preferred alternative considered by EPA in this Proposed Plan.

MARK YOUR CALENDAR

PUBLIC COMMENT PERIOD:

August 3, 2012 – September 4, 2012

EPA will accept written comments on the Proposed Plan during the public comment period.

PUBLIC MEETING:
August 9, 2012

EPA will hold a public meeting to explain the preferred remedy presented in the Proposed Plan. Oral and written comments will also be accepted at the meeting. The meeting will be held at the Carlstadt Borough Hall, located at 500 Madison Street, Carlstadt, New Jersey at 7:00 p.m.

For more information, see the Administrative Record at the following locations:

EPA Records Center, Region II
290 Broadway, 18th Floor
New York, New York 10007-1866
(212) 637-3261
Hours: Monday - Friday 9:00 am to 5:00 pm

The William E. Dermody Public Library
420 Hackensack Street
Carlstadt, NJ 07072
(201) 438-8866
Hours: Monday - Thursday 10:00 am to 9:00 pm, Friday 10:00 am to 5:00 pm, Saturday 10:00 am to 2:00 pm (closed Saturdays in July and August)

SITE HISTORY

The former SCP property lies at the corner of Paterson Plank Road (Route 120) and Gotham Parkway in Carlstadt, New Jersey. Peach Island Creek, a tributary to Berry's Creek, forms the northeastern border of the property and a trucking company forms the southeastern border (see Figure 1).

The land use in the vicinity of the Site is classified as light industrial by the Borough of Carlstadt. The establishments in the immediate vicinity of the Site include a bank, horse stables, warehouses, freight carriers, and service sector industries. There is a residential area located approximately 1.2 miles northwest of the Site.

The land on which the former SCP property is located was purchased in 1941 by Patrick Marrone, who used the land for solvent refining and solvent recovery. Mr. Marrone eventually sold the land to a predecessor of Inmar Associates, Inc. Aerial photographs from the 1950s, 1960s and 1970s indicate that drummed materials were stored on the property. On October 31, 1970, the Scientific Chemical Processing Company leased the property from Inmar Associates. SCP used the property for processing industrial wastes from 1971 until the company was shut down by court order in 1980.

While in operation, SCP received liquid byproduct streams from chemical and industrial manufacturing firms, and then processed the materials to reclaim marketable products which were sold to the originating companies. In addition, liquid hydrocarbons were processed to some extent, and then blended with fuel oil. The mixtures were typically sold back to the originating companies or to cement and aggregate kilns as fuel. SCP also received other wastes, including paint sludges, acids and other unknown chemical wastes.

In 1983, the Site was placed on the National Priorities List. Between 1983 and 1985, NJDEP required the property owner to remove approximately 250,000 gallons of wastes stored in tanks which had been abandoned at the Site.

In May 1985, EPA assumed the lead role in the response actions, and issued notice letters to more than 140 Potentially Responsible Parties (PRPs). EPA offered the PRPs an opportunity to perform a Remedial Investigation and Feasibility Study (RI/FS) for the Site, and in September 1985, EPA issued an Administrative Order on Consent to the 108 PRPs who had agreed to conduct the RI/FS. Subsequently, in October 1985, EPA issued a Unilateral Order to 31 PRPs who failed to sign the Consent Order. The Unilateral Order required the 31 PRPs to cooperate with the 108 consenting PRPs on the RI/FS. In the fall of 1985, EPA also issued an Administrative Order to Inmar Associates, requiring the company to remove and properly dispose of the contents of five tanks containing wastes contaminated with Polychlorinated Biphenyls (PCBs) and numerous other hazardous substances.

Inmar removed four of the five tanks remaining on the property in 1986. The fifth tank was not removed at the time because it contained high levels of PCBs and other contaminants, and disposal facilities capable of handling those wastes were not available at that time. The fifth tank and its contents were subsequently removed by the PRPs in February 1998 and disposed of at an EPA-approved off-site facility.

The PRPs initiated the RI/FS in April 1987, and it was completed in March 1990. The RI focused on the most heavily contaminated zone at the Site, which included the contaminated soil, sludge, and shallow groundwater within the SCP property, down to the clay layer (hereinafter, this zone will be referred to as the "Fill Area"). The RI also included data from the deeper groundwater areas, both on and off the SCP property. The deeper areas consist of the till aquifer, which lies just under the Fill Area's clay layer, and the bedrock aquifer, which underlies the till aquifer. Groundwater within both the till and bedrock aquifer was found to be contaminated with site-related compounds. The RI also found that the adjacent Peach Island Creek's surface water and sediments were impacted by contaminants similar to those found in the Fill Area.

The FS indicated that, although there seemed to be several potential methods or combinations of methods to remedy the Fill Area, there were uncertainties regarding the relative effectiveness of the various technologies. Consequently, EPA made a decision that treatment alternatives needed further assessment. In the meantime, however, measures were needed to contain and prevent exposure to the Fill Area contaminants. As such, an interim remedy for the on-property soil and shallow groundwater was selected in a September 1990 Record of Decision (ROD).

EPA typically addresses sites in separate phases and/or operable units. In developing an overall strategy for the Site, EPA has identified the interim Fill Area remedy as Operable Unit 1 (OU1), the final Fill Area remedy as OU2, and the off-property and deep groundwater remedy, which is the subject of this Proposed Plan, as OU3. Contamination in the adjacent Peach Island Creek will be addressed as part of another superfund site, Berry's Creek. Peach Island Creek is a tributary to Berry's Creek.

Interim Remedy: Soil and Shallow Groundwater on Property (OU1)

The goals of the interim remedy selected for OU1 were to prevent exposure to contaminated soil and sludge in the Fill Area and to prevent the contaminated groundwater within the Fill Area from migrating off-property. The interim remedy was constructed from August 1991 through June 1992 by the PRPs for the Site, with EPA oversight, pursuant to a Unilateral

Administrative Order dated September 28, 1990, and consisted of the following:

- A lateral containment wall comprised of a soil-bentonite slurry with an integral high density polyethylene (HDPE) vertical membrane surrounds the Fill Area and is keyed into the clay layer;

- A sheet pile retaining wall along Peach Island Creek;

- An HDPE horizontal infiltration barrier covering the property;

- An extraction system for shallow groundwater within the containment area with discharge to an above-ground storage tank for off-site disposal;

- A chain link fence around the property to restrict access; and

- Regular groundwater sampling, plus monitoring of the interim remedy to assure it remained effective until a final remedy was selected.

Final Remedy: Soil and Shallow Groundwater on Property (OU2)

While implementing the OU1 remedy, EPA continued to oversee additional RI/FS work which would provide information to select a final remedy for the Fill Area, as well as a remedy for the deep and off-property groundwater. A ROD selecting the Final Remedy for the Fill Area (OU2) was signed in August 2002. The major elements of the selected remedy included:

- Treatment of a Hot Spot area of contamination to reduce concentrations of volatile organic compounds, followed by soil stabilization of the area using cement and lime. If the treatment did not prove effective, the ROD specified that excavation of the Hot Spot area, with off-site disposal, would occur;

- Installation of a 2-foot thick “double containment” cover system over the entire Fill Area;

- Improvement of the existing, interim groundwater recovery system; and

- Improvement of the existing sheet pile wall along Peach Island Creek.

The OU2 remedy was implemented by the PRPs, with EPA oversight, pursuant to a Consent Decree entered in September 2004. Design of the remedy was completed in June 2007 and construction of the remedy was initiated in April 2008. Performance standards for the treatment and stabilization of the Hot Spot area of contamination were not met. As such, sludge and soil from the area was excavated and disposed of at an EPA-approved off-site disposal facility.

Implementation of the OU2 remedy was completed in October 2011. The groundwater recovery system is operating and regular maintenance is being conducted.

Off-Property and Deep Groundwater (OU3)

OU3 includes groundwater located outside of the boundaries of the former SCP property, as well as groundwater beneath the property, but deeper than the limits of the OU2 remedy (i.e., below the clay layer, in the till and bedrock aquifers). Investigation of OU3 groundwater has been ongoing since the initiation the RI for the Site in 1987. An Interim Data Report was submitted by the PRPs in 1997, and an Off-Property Groundwater Investigation Report was submitted in May 2003.

After reviewing the May 2003 report, EPA determined that additional investigation was needed to further define the nature and extent of groundwater contamination in the till and bedrock aquifers. The scope of the additional investigation was agreed to at a meeting with EPA in November 2006, and the associated fieldwork was conducted between March and July 2007. The Final Off-Property Groundwater Investigation Report for Operable Unit 3 (the Final RI for OU3) was submitted by the PRPs in July 2009.

A remedial action objectives and remedial alternatives (RAO/RA) report, identifying a preliminary list of remedial technologies for OU3, was submitted to EPA by the PRPs in June 2008. The RAO/RA report also proposed that bench and, possibly, pilot-scale studies be conducted to test the efficacy of certain remedial technologies for use at this Site.

Additional groundwater investigations were performed in advance of the bench and pilot-scale treatability studies that were conducted to support the OU3 FS. This additional investigation work was conducted in December 2009 and January 2010 in accordance with a work plan for additional groundwater delineation submitted by the PRPs in April 2009. The results were reported in an OU3 FS Phase 1 Treatability Studies report dated September 2010, which proposed further delineation activities and provided a work plan for an enhanced anaerobic bioremediation pilot test that is ongoing at the Site.

The OU3 RI/FS was completed in July 2012. The results of the OU3 RI are summarized below, and form the basis for the development of the FS report. Both documents, as well as the OU3 Human Health Risk Assessment, can be found in the Administrative Record for the Site.

SITE CHARACTERISTICS

The stratigraphy at the Site consists of the following layers:

- Man made fill (3 to 10 feet thick)
- Marine and marsh “meadow mat” (0 to 4 feet thick)
- Glaciolacustrine varved clay unit, including an upper stiff bedded unit and a lower soft plastic unit (0 to 20 feet thick)
- Glacial till, including a soft upper unit (0 to 17 feet thick) and an over-consolidated lower lodgement till (0 to 30 feet thick)
- Passaic Formation bedrock consisting of siltstones and mudstones with occasional interbeds of sandstones.

The geologic layers that are most relevant to OU3 include the glaciolacustrine varved material, which serves as a confining layer, and the underlying glacial till and bedrock aquifers, which are designated as Class IIA groundwater by the State of New Jersey, which means they are potential sources of drinking water. However, no wells in the affected area are used for potable water purposes.

Groundwater generally flows to the north from the property. However, the flow direction and water levels are significantly influenced by the presence of several extraction wells in the vicinity, used for non-residential, non-potable water purposes, which operate during the week and then sit idle during the weekend. During the weekend, flows can actually reverse direction and head south, away from the property, or more generally can flow towards the northwest.

Sampling Results

The results of the RI are summarized in the final report dated July 2009. Additional sampling conducted since that time has been incorporated into the FS for OU3.

The primary contaminants of concern in groundwater at the Site include Volatile Organic Compounds (VOCs), predominantly tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (DCE), and vinyl chloride, localized areas of aromatic hydrocarbons, including benzene, toluene, ethylbenzene, and xylenes, and 1,4-dioxane.

There are two distinct areas of contamination in the OU3 groundwater. They are described separately below.

Northern Area Contamination

The primary contaminants of concern in the northern area are the VOCs mentioned above. Concentrations decrease substantially with increasing horizontal and vertical distance from the former SCP property. For example, the highest concentrations of total VOCs in the bedrock, approximately 3,000 parts per billion (ppb), were found in Monitoring Well -13R (MW-13R), which is located adjacent to the northwest corner of the former SCP property. Total VOC concentrations decrease to trace levels in the bedrock just 600 to 1,000 feet away horizontally. Concentrations also decline vertically, with only trace VOC concentrations detected in MW-23R, located adjacent to but deeper than MW-13R.

Similarly, the highest concentration of total VOCs detected in the till wells was approximately 5,500 ppb in MW-5D, which is located in the northwest corner of the property, and draws water from beneath the OU2 containment remedy. Concentrations in the till aquifer decline to 718 ppb in MW-20D, located approximately 500 feet north of the property, to 5 ppb in MW-26D, located approximately 950 feet north of the property. Total VOC concentrations also decline to 51 ppb in MW-25D, approximately 1,000 feet northwest of the property.

Southern Area Contamination

The primary contaminant of concern that defines the contamination to the south of the property is 1,4-dioxane, though other contaminants, including benzene and 1,1-dichloroethane, are also present at elevated concentrations. 1,4-dioxane has been detected in groundwater in the southern area at concentrations ranging from 5 ppb to 6,300 ppb. The highest concentrations were observed in the soft till, and were an order of magnitude higher than in groundwater samples collected in the shallower, lodgement till.

1,4-dioxane does not appear to be present above concentrations of concern in the bedrock aquifer.

SCOPE AND ROLE OF THIS ACTION

As stated previously, EPA is addressing this Site in three operable units, two of which have already been implemented. OU1 provided an interim infiltration barrier, slurry wall, groundwater collection system, and off-site disposal of contaminated groundwater. OU2 improved upon and made permanent the OU1 remedy. It constituted the final remedy for the Fill Area of the Site. OU3, the final operable unit and the subject of this Proposed Plan, addresses contaminated groundwater in the deeper aquifers where contamination extends off-property and under the OU2 containment area. The Remedial Action Objectives for OU3 are to prevent unacceptable exposures to impacted groundwater, control future migration of contaminants of concern in the groundwater, and restore groundwater quality to regulatory or risk-based concentrations.

SUMMARY OF OPERABLE UNIT 3 RISKS

The purpose of a human health risk assessment is to identify potential cancer risks and non-cancer health hazards at a site assuming that no further remedial action is taken. A baseline human health risk assessment (BHHRA) was performed to evaluate current and future cancer risks and non-cancer health hazards based on the results of the RI.

An ecological risk assessment was determined to be unnecessary for OU3. The OU2 remedy specified that ecological risks would be addressed as part of the OU3 remedy. However, at that time, Peach Island Creek was to be addressed as part of the Site. However, contamination in the creek, and any associated ecological risks, will now be addressed as part of the Berry's Creek site.

Human Health Risk Assessment

As part of the RI, a BHHRA was conducted to estimate the risks and hazards associated with the current and future effects of contaminants on human health. A BHHRA is an analysis of the potential adverse human health effects caused by hazardous substance exposure in the absence of any actions to control or mitigate exposure under current and future land uses. The BHHRA for OU3 considered exposure to Chemicals of Potential Concern (COPCs) in the bedrock and till groundwater aquifers assuming no remediation and no institutional controls.

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current and future land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the contaminants of concern at the site in various media (i.e., soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Examples of exposure pathways for a groundwater site include ingestion of groundwater and inhalation of volatiles while showering. Factors relating to the exposure assessment include, but are not limited to, the concentrations that people might be exposed to and the potential frequency and duration of exposure. Using these factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response) are determined. Potential health effects are chemical- specific and may include the risk of developing cancer over a lifetime or other non-cancer health effects, such as changes in the normal functions of organs within the body (e.g., changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health effects.

Risk Characterization: This step summarizes and combines exposure information and toxicity assessments to provide a quantitative assessment of site risks. Exposures are evaluated based on the potential risk for developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one in ten thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions explained in the exposure assessment. Current federal Superfund guidelines for acceptable exposures are an individual lifetime excess cancer risk in the range of 10^{-4} to 10^{-6} (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk). For non-cancer health effects, a "hazard index" (HI) is calculated. An HI represents the sum of the individual exposure levels compared to their corresponding Reference Doses. The key concept for a non-cancer HI is that a "threshold level" (measured as an HI of 1) exists below which non-cancer health effects are not expected to occur.

A four-step human health risk assessment process was used for assessing site-related cancer risks and non-cancer health hazards. The four-step process is comprised of: Hazard Identification of COPCs, Exposure Assessment, Toxicity Assessment, and Risk Characterization (see “What Is Risk and How Is It Calculated” box on previous page).

The current/future land use scenarios evaluated in the BHHRA included the following exposure pathways and receptors:

- Adult/Child Residents: ingestion of, dermal contact with, and inhalation of vapors from OU3 groundwater.
- Industrial Workers: ingestion of and dermal contact with OU3 groundwater.

There are currently no known exposures to OU3 groundwater, and it is not used a potable source, so the BHHRA focused on future risk conditions.

Exposure point concentrations in groundwater were estimated using either the maximum detected concentration of a contaminant or the 95%, 97.5% or 99% upper-confidence limit (UCL) of the average concentration. Chronic daily intakes were calculated based on the reasonable maximum exposure (RME), which is the highest exposure reasonably anticipated to occur at the Site. The RME is intended to represent a conservative exposure scenario that is still within the range of possible exposures. Central tendency exposure (CTE) assumptions, which represent typical, average exposures, were also developed. A complete summary of all exposure scenarios can be found in the BHHRA.

Summary of Risks to Future Residents
The carcinogenic risk calculated for future adult residents under RME conditions was $3x10^{-3}$ (three in 1,000), which exceeds the acceptable risk range of 10^{-4} (one in 10,000) to 10^{-6} (one in 1,000,000). The risk is due primarily to ingestion of 1,4-dioxane (77%) and TCE (13%) in the groundwater. The total estimated adult cancer risk calculated using CTE assumptions was $4x10^{-4}$ (4 in 10,000), which is within the upper bounds of the acceptable risk range.

The carcinogenic risk calculated for future child residents under RME conditions was $2x10^{-3}$ (2 in 1,000), which is due primarily to the ingestion of 1,4-dioxane (45%) and TCE (41%) in the groundwater. The total estimated future child cancer risk under CTE conditions was calculated to be $1x10^{-3}$ (one in 1,000), which still exceeds the risk range.

The non-cancer Hazard Index (HI) calculated for future adult residents was 54 under RME conditions and 25 under CTE conditions. Both of these exceed the goal of protection of an HI of less than 1. The primary COPCs in groundwater contributing to the total HI are 1,4-dioxane, TCE and cis-1,2-dichloroethene.

For future child residents, the total HI was calculated to be 125 under RME conditions and 63 under CTE conditions, due primarily to ingestion of 1,4-dioxane,cis-1,2-dichloroethene, TCE and PCE in groundwater. Again, the overall HI is greater than the goal of protection of an HI of less than 1 for both the RME and CTE exposures.

An evaluation of cancer risks and non-cancer hazards associated with showering were found to be below the cancer risk range and an HI of 1 for potential future residents.

Summary of Risks to Industrial Workers
Under future exposure conditions, the sum of all RME cancer risks for the adult industrial/commercial worker was calculated to be $9x10^{-4}$ (9 in 10,000), which exceeds the acceptable risk range. Estimated risks are primarily driven by ingestion of 1,4-dioxane (78%) and TCE (13%) in groundwater. The total estimated cancer risk under CTE conditions was calculated to be $4x10^{-4}$ (4 in 10,000), which is within the upper bounds of the acceptable risk range.

The total estimated non-cancer HI for future industrial/ commercial workers was calculated to be 19 under RME conditions and 10 under CTE conditions, due primarily by the ingestion of TCE in groundwater. The overall HI is greater than the goal of protection of an HI of less than 1 under both RME and CTE exposure conditions.

Summary
The results of the BHHRA indicate that action is necessary to reduce the risks associated with contamination in the OU3 groundwater. In addition, it is EPA’s judgment that the Preferred Alternative identified in this Proposed Plan is necessary to protect public health or welfare from actual or threatened releases of hazardous substances into the environment.

REMEDIAL ACTION OBJECTIVES

Based on the human health risk assessment, the primary contaminants of concern in the deep and off-property groundwater are VOCs, aromatic hydrocarbons, and 1,4-dioxane. There are no current completed exposure pathways to OU3 groundwater, but future exposure pathways are associated with potential groundwater extraction and use via ingestion, inhalation and dermal contact routes. The vapor intrusion pathway is not a concern due to the depth of the OU3 groundwater. The relatively clean shallow groundwater (5 to 10 feet below ground surface) would effectively block the potential migration of volatile contaminants from the deeper groundwater (more than 30 feet below ground surface) to the surface.

The following remedial action objectives address the human health risks and environmental concerns posed at the Site:

- Prevent unacceptable exposures to impacted groundwater;
- Control future migration of contaminants of concern in the groundwater; and
- Restore groundwater quality to the lower of the federal drinking water standards or the New Jersey Groundwater Quality Standards (NJGWQSs).

The cleanup of the Site is based on remediating the contaminated groundwater to within EPA's acceptable cancer risk range for a reasonable maximum exposure if the groundwater were utilized in the future for residential purposes. The cleanup goals also have to be consistent with federal drinking water standards and NJGWQSs. The Preliminary Remediation Goals proposed by EPA for the contaminants of potential concern for OU3 are based on the NJGWQSs, and are consistent with federal and state guidance.

SUMMARY OF REMEDIAL ALTERNATIVES

Remedial alternatives for the off-property groundwater are presented below. Potential applicable technologies were initially identified and screened using effectiveness, implementability, and cost as criteria, with an emphasis on the effectiveness of the alternative. Those technologies that passed the initial screening were then assembled into three remedial alternatives which were fully evaluated in the FS.

The time frames below for construction do not include the time to design the remedy or to procure necessary contracts. Because each of the action alternatives are expected to take longer than five years, a Site review will be conducted every five years (Five-Year Review) until remedial goals are achieved.

Alternative 1 – No Action

Regulations governing the Superfund program require that the "no action" alternative be evaluated generally to establish a baseline for comparison. Under this alternative, EPA would take no action at the Site to prevent exposure to the groundwater contamination.

Total Capital Cost	$0
Total Operation and Maintenance	$0
Total Present Worth Cost	$0
Estimated Timeframe	None

Alternative 2 – In-Situ Treatment, Monitored Natural Attenuation, and Institutional Controls

Total Capital Cost	$1,772,439
Total Operation and Maintenance	$4,634,880
Total Present Worth Cost	$7,830,000
Estimated Timeframe	30 years

This alternative would treat the contamination in the groundwater directly, through the injection of a substance, or substances, designed to cause or enhance the breakdown of the contaminants of concern to less toxic forms.

As described above, there are two distinct areas of contamination for OU3. A bench-scale test was conducted on the southern portion of the plume and a long-term, pilot-scale test is nearing completion in the northern portion of the plume. Both tests indicate that in-situ treatment technologies can effectively remediate the contamination that is present in the OU3 groundwater.

Based on the test results, it is anticipated at this time that enhanced anaerobic bioremediation (EAB) would be utilized to treat the contaminants in the northern portion of the plume and that in-situ chemical oxidation (ISCO) would be used on the southern portion. To arrive at the cost estimates provided above, the following assumptions were made in the FS:

Northern Area

- Treatment using EAB through the injection of lactate into the till aquifer;
- 51 injection wells were assumed, with 9 to be located on-property and the rest located off of the former SCP property; and

- Off-property injections of lactate were assumed to occur quarterly for 5 years, while on-property injections were assumed to continue for up to 30 years.

Southern Area

- Based on the bench-scale tests that were conducted, treatment using ISCO through the injection of a combination of sodium persulfate and sodium hydroxide into the aquifer;
- 20 injection wells were assumed, with 7 to be located on-property and the rest off of the property; and
- A total of 3 injections were assumed, over a period of 3 to 5 years.

The details of the in-situ treatment technology to be used in each area, including the substances to be injected, the number of injection points, the extent of the treatment zone, and the timeframes for treatment, would be refined during the remedial design, and may change significantly based on the final results of the pilot study and results from the pre-design investigation. However, the use of an in-situ treatment technology or technologies is expected to remain an appropriate remedy for OU3.

After the initial treatment period, monitored natural attenuation (MNA) would be used to complete the remediation of OU3 groundwater. MNA addresses contaminated groundwater through ongoing natural attenuation processes accompanied by verification monitoring. By EPA's definition, MNA utilizes natural in-situ processes to reduce the mass, toxicity, mobility, volume, and/or concentration of chemicals through biodegradation, dispersion, dilution, sorption, volatilization, and/or chemical or biological stabilization, transformation, or destruction of contaminants. The primary in-situ process contributing to the ongoing natural attenuation that has been documented for the contaminants present in OU3 is biodegradation (i.e., the natural breakdown of chemicals through biological processes). Multiple lines of evidence exist which show that natural attenuation processes are occurring.

Institutional controls would also be part of this alternative. A deed notice is already in place which restricts the placement of groundwater wells on the former SCP property itself. In addition, a Classification Exception Area/Well Restriction Area (CEA/WRA) would be established to prevent the installation of wells within the affected area until the remediation is complete.

Alternative 3 – Groundwater Extraction and Treatment, Monitored Natural Attenuation, and Institutional Controls

Total Capital Cost	$1,972,573
Total Operation and Maintenance	$6,512,820
Total Present Worth Cost	$11,140,000
Estimated Timeframe	30 years

In this alternative, contaminated groundwater from OU3 would be extracted, treated on-site, and then disposed of off-site. Detailed modeling would need to be conducted during the design to determine, for example, where to place the extraction wells, how many to place, and how to treat the contaminated water. However, to arrive at the cost estimates above, it was assumed that five extraction wells screened in the till unit to just above bedrock would be needed. Three would be located in the northern area and two would be placed in the southern area. All wells were assumed to pump at a rate of two gallons per minute.

Separate processes would be needed to treat the water contaminated with 1,4-dioxane from the water contaminated with other VOCs only, since 1,4-dioxane is both much more soluble in water and does not adsorb as readily to carbon as the other VOCs present in the groundwater. Disposal of the water would be either directly to a surface water body or to a publicly operated treatment facility.

As with Alternative 2, MNA would be used to address contamination outside of the extraction zone, which would be refined during the remedial design, and institutional controls would be used to assure that the alternative remains protective while the remediation is being completed.

EVALUATION OF ALTERNATIVES

EPA uses nine evaluation criteria to assess remedial alternatives individually and against each other in order to select a remedy. The criteria are described in the box on the next page. This section of the Proposed Plan profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration. A detailed analysis of each of the alternatives is in the FS report. A summary of those analyses follows.

Overall Protectiveness of Human Health and the Environment

Alternative 1 (no action) would not provide protection of human health and the environment in the long term, since contamination would persist in the groundwater. Alternative 2 (in-situ treatment) and Alternative 3 (ex-situ treatment) would eliminate risk through treatment or removal of the contaminated groundwater in the long term, and would be protective in the short term through the placement of institutional controls. Both would comply with the RAOs.

Since Alternative 1 is not protective of human health and the environment, it is eliminated from consideration under the remaining eight criteria.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Alternatives 2 and 3 will comply with ARARs over time. Both would comply with chemical-specific ARARs through either treatment or removal of contaminated groundwater, though Alternative 2 would likely achieve chemical-specific ARARs faster than Alternative 3. Similarly, both alternatives would meet action-specific ARARs, though due to the need for disposal of treated groundwater, it would be much more difficult for Alternative 3 to meet them.

Long-Term Effectiveness and Permanence

Both alternatives would provide long-term effectiveness and permanence, since under both alternatives the impacted groundwater would either be treated or removed. Both would require long-term monitoring until ARARs are achieved, though Alternative 3 would likely require a longer active treatment time.

Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative 2 would reduce the toxicity, mobility, and volume of contaminants in the groundwater through treatment. The treatment would degrade contaminants to less-toxic forms, thereby reducing both toxicity and volume, and would reduce mobility through direct source control. Alternative 3 would reduce both the mobility and volume of contaminants in the groundwater, but would not enhance the reduction of toxicity in-situ that is already occurring through natural attenuation processes.

THE NINE SUPERFUND EVALUATION CRITERIA

Overall Protectiveness of Human Health and the Environment determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

Compliance with ARARs evaluates whether the alternative meets Federal and State environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

Long-term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.

Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.

Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

Cost includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

State/Support Agency Acceptance considers whether the State agrees with the EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.

Community Acceptance considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

Short-Term Effectiveness

Both alternatives would have some impact to the community during pre-design investigations. The impacts to the community posed by Alternative 2 would be low. Periodic access to some properties would be needed to complete injections during the active treatment period and during the long-term monitoring of wells. Alternative 3 would have a much greater impact on the community due to the need to construct a treatment plant and a groundwater extraction and discharge system. Since a conveyance system to carry the water from the extraction wells to the treatment system would need to be installed, including along roadways and utility corridors, construction of the system would impact both public and private properties

Implementability

Alternative 2 is readily implementable. The materials needed are generally available and only limited access will be needed to properties near the Site. Alternative 3 is also implementable, but it would pose a greater challenge to implement than Alternative 2. While the materials needed should be readily available, more invasive access will be needed to properties to install pipelines and extraction wells.

Cost

Alternative 3 has a slightly higher capital cost than Alternative 2 due to the need to construct a groundwater extraction and treatment facility. Alternative 3 also has a significantly higher operations and maintenance cost than Alternative 2.

State/Support Agency Acceptance

The State of New Jersey agrees with the preferred alternative in this Proposed Plan.

Community Acceptance

Community acceptance of the preferred alternative will be evaluated after the public comment period ends and will be described in the ROD for the Site.

SUMMARY OF THE PREFERRED ALTERNATIVE

The Preferred Alternative for cleanup of the OU3 groundwater at the SCP Site in Carlstadt, New Jersey is Alternative 2, In-Situ Treatment, Monitored Natural Attenuation, and Institutional Controls.

In-situ treatment of various contaminants has worked successfully at other sites, and results of bench-scale and pilot-scale tests conducted at this Site indicate that in-situ treatment options should be available to effectively treat the contamination present at this Site. As part of the remedy, monitored natural attenuation will be conducted during and after treatment and institutional controls will be maintained to assure the remedy remains protective until cleanup goals are met.

EPA believes the Preferred Alternative will be protective of human health and the environment, will comply with ARARs, will be cost effective, and will utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. Through the use of an in-situ treatment technology to treat the groundwater, the Selected Remedy meets the statutory preference for the use of remedies that employ treatment that reduces toxicity, mobility or volume as a principal element to address the principal threats at the Site. The Preferred Alternative can change in response to public comment or new information.

Consistent with EPA Region 2's *Clean and Green* policy, EPA will evaluate the use of sustainable technologies and practices with respect to any remedial alternative selected for the Site.

As is EPA's policy, Five-Year Reviews will be conducted until remediation goals are achieved and the Site is available for unrestricted use and unlimited exposure.

COMMUNITY PARTICIPATION

EPA provides information regarding the cleanup of the SCP Superfund Site to the public through public meetings, the Administrative Record file for the Site, and announcements published in the South Bergenite newspaper. EPA and NJDEP encourage the public to gain a more comprehensive understanding of the Site and the Superfund activities that have been conducted there.

The dates for the public comment period, the date, location and time of the public meeting, and the locations of the Administrative Record files, are provided on the front page of this Proposed Plan.

For further information on the SCP site, please contact:

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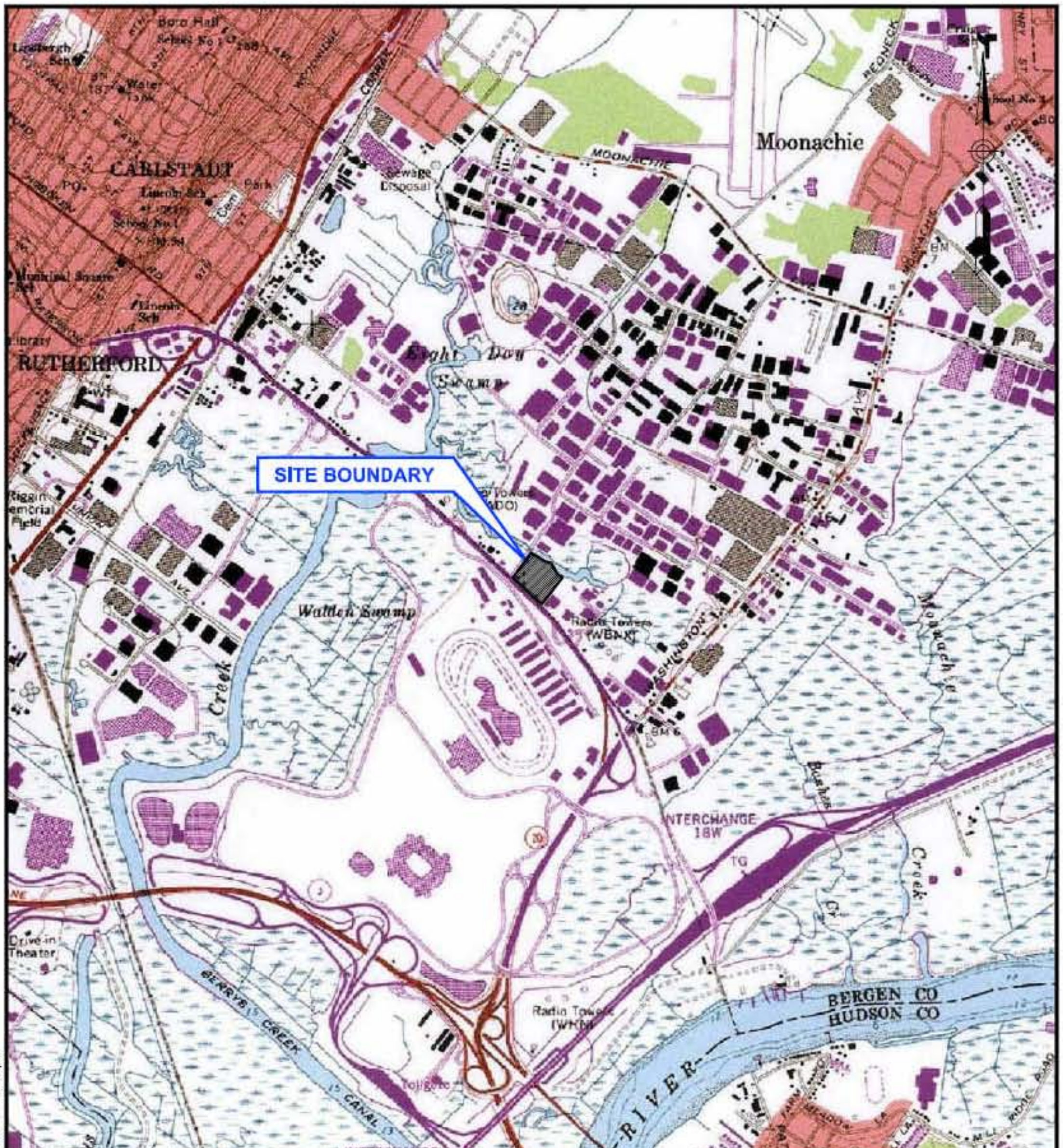

REFERENCES

1.) BASE MAP TAKEN FROM U.S.G.S. 7.5 MINUTE QUADRANGLE OF WEEHAWKEN, NEW JERSEY, DATED 1967 AND PHOTOREVISED 1981.

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APPROXIMATE SCALE FEET

Golder Associates
Mt. Laurel, New Jersey

FILE No.	9436222V018	CHECK	HAL	
PROJECT No.	943–6222 REV. 0	REVIEW	PSF	216 PATERSON PLANK ROAD SITE
SCALE	AS SHOWN	DATE	05/04/12	TITLE: SITE LOCATION MAP
DESIGN	HAL	CADD	AM	FIGURE 1

Drawing file: 9436222V018.dwg May 04, 2012 – 12:04pm

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